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REMARKS

Claims 1-4, 6-10, 12-15, and 17-21 are all the claims presently pending in the application. Claims 1, 4, and 6 are amended to more clearly define the invention. Claims 1, 3-4, 6-8, and 10 are independent.

These amendments are made only to more particularly point out the invention for the Examiner and not for narrowing the scope of the claims or for any reason related to a statutory requirement for patentability.

Applicant also notes that, notwithstanding any claim amendments herein or later during prosecution, Applicant's intent is to encompass equivalents of all claim elements.

Entry of this §1.116 Amendment is proper. Since the Amendments above narrow the issues for appeal and since such features and their distinctions over the prior art of record were discussed earlier, such amendments do not raise a new issue requiring a further search and/or consideration by the Examiner. As such, entry of this Amendment is believed proper and Applicant earnestly solicits entry. No new matter has been added.

Applicant gratefully acknowledges the Examiner's indication that claims 3, 7-10, 12-15, 17, and 19-21 are allowed. However, Applicant respectfully submits that all of the claims are allowable.

Claims 1-2, 4, 6, and 18 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over the Oka et al. reference in view of the Hein reference.

This rejection is respectfully traversed in the following discussion.

I. THE CLAIMED INVENTION

A first exemplary embodiment of the claimed invention as defined by, for example,

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independent claim 1, is directed to an electric power steering device for transmitting rotation of a steering assisting electric motor to a steering mechanism through a small gear and a large gear. The device includes a first member on a rotary shaft of the electric motor, a second member at one end of the small gear, and an elastic member between the first and second members for transmitting a torque between the two members. The elastic member has a first torsional elastic modulus when a torsion angle between the first and second members is less than a predetermined angle, and a second torsional elastic modulus when the torsion angle is one of equal to and larger than the predetermined angle. The first torsional elastic modulus is smaller than the second torsional elastic modulus. The elastic member includes a radially and axially extending plate-shaped portion. At least one of the elastic member and said first and second members includes a circumferentially extending projection at an outer periphery. If the elastic member includes the circumferentially extending projection, then a radially extending surface of the circumferentially extending projection contacts the first and second members when no torque or low torque is applied to one of the first and second members. If at least one of the first and second members includes the circumferentially extending projection, then the circumferentially extending projection contacts the elastic member when no torque or low torque is applied to one of the first and second members.

A second exemplary embodiment of the claimed invention as defined by, for example, independent claim 6, is directed to a joint for use in an electric power steering device. The joint includes a first member, a second member, and an elastic member between the first and second members for transmitting a torque between the two members. The elastic member has a first torsional elastic modulus when a torsion angle between the first and second members is less than a predetermined angle, and a second torsional elastic modulus when the torsion

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angle is one of equal to and larger than the predetermined angle. The first torsional elastic modulus is smaller than the second torsional elastic modulus. The elastic member includes a projection having a bifurcated structure defining a slit portion.

Conventional power steering devices do not operate a steering assist motor under low torque loads. Therefore, under these low torque loads, the steering assist motor acts as a torsional drag element which deteriorates the feel of the steering.

The present invention overcomes this problem by providing at least one of the elastic member and said first and second members includes a circumferentially extending projection at an outer periphery, where if the elastic member includes the circumferentially extending projection, then the circumferentially extending projection contacts the first and second members when no torque or low torque is applied to one of the first and second members and if at least one of the first and second members includes the circumferentially extending projection, then a radially extending surface of the circumferentially extending projection contacts the elastic member when no torque or low torque is applied to one of the first and second members (as recited by independent claims 1 and 4) or by providing an elastic member that includes a projection having a bifurcated structure defining a slit portion (as recited by independent claim 6). This feature provides an elastic member with a two-stage torsional elastic modulus. In this manner, the steering feeling during low torque, such as during small steering angle inputs, is significantly improved (page 3, lines 9-14).

II. THE DRAWING OBJECTION

Applicant notes that the Examiner repeats the drawing objection from the previous Office Action and alleges that the Applicant did not address this objection. However,

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contrary to the Examiner's allegation, Applicant very clearly addressed this objection on page 15 of the Amendment filed on July 27, 2005. The traversal of the Examiner's rejection from the July 27, 2005, Amendment is repeated here again for the Examiner's convenience.

The Office Action objects to the drawings because "the 'elastic member 45' is not correctly depicted with alternately-heavy cross-hatching." (Emphasis original). Applicant respectfully traverses this objection.

In particular, as clearly illustrated in M.P.E.P. § 608.02, alternately-heavy cross-hatching is used to illustrate "section of synthetic resin or plastic" (emphasis added) and is not used to represent an elastic material. None of the claims require the use of a synthetic resin or plastic. Therefore, Applicants respectfully submit that the drawings do not require correction. Should the Examiner continue to have concerns over the drawings, Applicant invites the Examiner to contact the undersigned to address this important matter.

III. THE 35 U.S.C. § 112, SECOND PARAGRAPH REJECTION

The Examiner alleges that claims 1-2 and 4 are indefinite. While Applicant submits that such would be clear to one of ordinary skill in the art to allow them to know the metes and bounds of the invention, taking the present Application as a whole, to speed prosecution claims 1 and 4 have been amended in accordance with Examiner Lum Vannucci's very helpful suggestions.

However, with respect to the "plate-shaped portions" of the "elastic member" the Examiner alleges that these features are unclear and can not be identified. The Examiner notes that Figure 3 illustrates an exemplary elastic member 45 having a "multi-pronged" shape. For the purpose of clarification for the Examiner and using the Examiner's own

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language each “prong” of the elastic member 45 illustrated in Figure 3 is a “plate-shaped portion.” Applicant respectfully submits that it would have been clear to one of ordinary skill in the art that the “prongs” of the elastic member 34 that is illustrated by, for example, Figure 3, correspond to the claimed “plate-shaped portions.”

In view of the foregoing, the Examiner is respectfully requested to withdraw this rejection.

IV. THE PRIOR ART REJECTION

The Examiner alleges that the Hein reference would have been combined with the Oka et al. reference to form the claimed invention. Applicant submits, however, that these references would not have been combined and, even if combined, the combination would not teach or suggest each and every element of the claimed invention.

Applicant submits that none of the applied references teaches the features of the claimed invention including: 1) at least one of the elastic member and said first and second members includes a circumferentially extending projection at an outer periphery, where if the elastic member includes the circumferentially extending projection, then the circumferentially extending projection contacts the first and second members when no torque or low torque is applied to one of the first and second members and if at least one of the first and second members includes the circumferentially extending projection, then a radially extending surface of the circumferentially extending projection contacts the elastic member when no torque or low torque is applied to one of the first and second members (as recited by independent claims 1 and 4); and 2) an elastic member that includes a projection having a bifurcated structure defining a slit portion (as recited by independent claim 6). As explained

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above, these features are important for providing an elastic member with a two-stage torsional elastic modulus which significantly improve the steering feeling during low torque, such as during small steering angle inputs.

Clearly, the Oka et al. reference does not teach or suggest any of these features.

Indeed, the Examiner does not allege that the Oka et al. reference discloses these features.

The Hein reference does not remedy the deficiencies of the Oka et al. reference.

Rather, the Hein reference discloses a flexible coupling 12 that has radially extending inner portions 25 and outer portions 26 extending radially from and beyond the inner portions 25. (Col. 2, lines 31-34).

Clearly, the flexible coupling 12, that is disclosed by the Hein reference does not teach or suggest an elastic member having a circumferentially extending projection at an outer periphery, as recited by independent claims 1 and 4.

Further, the Hein reference does not teach or suggest a first or second member which includes a circumferentially extending projection at an outer periphery which contacts the elastic member when no torque or low torque is applied to one of the first and second members.

With respect to independent claim 6, the Examiner concedes that none of the applied references teaches or suggests an elastic member that includes a projection having a bifurcated structure defining a slit portion.

Additionally, Applicant respectfully submits that these references would not have been combined as alleged by the Examiner. Indeed, the references are directed to completely different and unrelated matters and problems.

Specifically, the Oka et al. reference is concerned with providing a joint for a steering

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assist system that is capable of damping the vibration of a worm shaft and that permits relative rotation between shafts when the rotational resistance is increased abnormally. (Col. 2, lines 10 - 31).

In stark contrast, the Hein reference is concerned with providing a flexible coupling that does not operate under a shear load, does not require bonding, and also provides a multiple resilient spring rate. (col. 1, lines 45-65).

One of ordinary skill in the art who was concerned with damping the vibration of a worm shaft and that permits relative rotation between shafts when the rotational resistance is increased abnormally, as the Oka et al. reference is concerned, would not have referred to the Hein reference, because the Hein reference is concerned with the completely different and unrelated problem of providing a flexible coupling that does not operate under a shear load, does not require bonding, and that provides a multiple resilient spring rate. Thus, these references would not have been combined.

Applicant respectfully requests withdrawal of the rejection of claims 1-2, 4, 6, and 18.

V. FORMAL MATTERS AND CONCLUSION

In view of the foregoing amendments and remarks, Applicant respectfully submits that claims 1-4, 6-10, 12-15, and 17-21, all the claims presently pending in the Application, are patentably distinct over the prior art of record and are in condition for allowance. The Examiner is respectfully requested to pass the above application to issue at the earliest possible time.

Should the Examiner find the Application to be other than in condition for allowance, the Examiner is requested to contact the undersigned at the local telephone number listed

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below to discuss any other changes deemed necessary in a telephonic or personal interview.

The Commissioner is hereby authorized to charge any deficiency in fees or to credit any overpayment in fees to Attorney's Deposit Account No. 50-0481.

Respectfully Submitted,

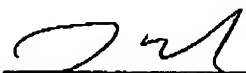
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CERTIFICATION OF FACSIMILE TRANSMISSION

I hereby certify that I am filing this Amendment After Final Rejection Under 37 CFR §1.116 by facsimile with the United States Patent and Trademark Office to Examiner Lee Sin Yee Lum Vannucci, Group Art Unit 3611 at fax number (571) 273-8300 this 20th day of January, 2006.


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